

What is claimed is:

[Claim 1] 1. A method of fabricating a pixel structure of a liquid crystal display panel, comprising:

forming a polysilicon layer over a first substrate;

 patterning the polysilicon layer to form a polysilicon island, wherein the polysilicon island has an active device region and a storage capacitor region;

 implanting ions into the storage capacitor region of the polysilicon island to form a bottom electrode;

 forming a gate-insulating layer over the polysilicon island;

 forming a gate over the gate insulating layer within the active device region and forming a top electrode over the gate insulating layer within the storage capacitor region;

 implanting ions into the active device region of the polysilicon island using the gate as an implant mask to form a source and a drain;

 forming an insulating layer over the gate-insulating layer to cover the gate and the top electrode;

 forming a pixel electrode over the insulating layer, wherein the pixel electrode is electrically connected to the drain and the bottom electrode;

providing a second substrate;

 forming an electrode film over the second substrate, wherein the electrode film and the top electrode are electrically connected to a common electrode;

and

 forming a liquid crystal layer between the first substrate and the second substrate.

[Claim 2] 2. The method of claim 1, wherein the step of implanting ions into the storage capacitor region of the polysilicon island to form the bottom electrode comprises:

 forming a photoresist layer over the polysilicon island to cover the active device region;

 implanting ions into the storage capacitor region of the polysilicon island using the photoresist layer as an implant mask; and

removing the photoresist layer.

[Claim 3] 3. The method of claim 1, wherein the step of forming the polysilicon island and implanting ions into the storage capacitor region of the polysilicon island to form the bottom electrode comprises:

forming a photoresist layer over the polysilicon layer, wherein the photoresist layer comprises a first portion that covers the active device region and a second portion that covers the storage capacitor region and the first portion has a thickness greater than the second portion;

etching the polysilicon layer using the photoresist layer as a mask to form the polysilicon island;

removing the second portion of the photoresist layer;

implanting ions into the storage capacitor region of the polysilicon island using the first portion of the photoresist layer as a mask; and
removing the photoresist layer.

[Claim 4] 4. The method of claim 3, wherein the step of forming the photoresist layer comprises performing a photolithographic process using a photomask having a halftone exposure region and a non-exposure region so that the first portion corresponds to the non-exposure region and the second portion corresponds to the halftone exposure region.

[Claim 5] 5. The method of claim 3, wherein the step of removing the second portion of the photoresist layer comprises performing an ashing process.

[Claim 6] 6. The method of claim 1, wherein before forming the polysilicon layer, further comprising forming a buffer layer over the substrate.

[Claim 7] 7. The method of claim 1, wherein before forming the electrode film over the second substrate, further comprising forming a color filter layer on the second substrate.

[Claim 8] 8. A pixel structure for a liquid crystal display panel, comprising:

a first substrate;

a single-type low temperature polysilicon thin film transistor disposed over the first substrate;

a pixel structure disposed over the first substrate and electrically connected to the single-type low temperature polysilicon thin film transistor;

a storage capacitor disposed over the first substrate, wherein one of the terminals of the storage capacitor is electrically connected to the single-type low temperature polysilicon thin film transistor and the storage capacitor is regarded as a symmetrical capacitor related to the single-type low temperature polysilicon thin film transistor;

a second substrate disposed over the first substrate;

an electrode film disposed on the second substrate;

a liquid crystal layer disposed between the first substrate and the second substrate; and

a liquid crystal capacitor disposed between the first substrate and the second substrate, wherein one of the terminals of the liquid crystal capacitor is electrically connected to the single-type low temperature polysilicon thin film transistor while the other terminal of the liquid crystal capacitor and the other terminal of the storage capacitor are electrically connected to a common electrode.

[Claim 9] 9. The pixel structure of claim 8, wherein the single-type low temperature polysilicon thin film transistor comprises a P-type low temperature polysilicon thin film transistor.

[Claim 10] 10. The pixel structure of claim 9, wherein the terminals of the storage capacitor comprises a top electrode and a bottom electrode such that the bottom electrode is a P-doped region.

[Claim 11] 11. The pixel structure of claim 8, wherein the single-type low temperature polysilicon thin film transistor comprises an N-type low temperature polysilicon thin film transistor.

[Claim 12] 12. The pixel structure of claim 11, wherein the terminals of the storage capacitor comprises a top electrode and a bottom electrode such that the bottom electrode is an N-doped region.

- [Claim 13] 13. The pixel structure of claim 8, wherein the single-type low temperature polysilicon thin film transistor comprises a single gate low temperature polysilicon thin film transistor or a dual gate low temperature polysilicon thin film transistor.
- [Claim 14] 14. The pixel structure of claim 8, wherein the terminals of the liquid crystal capacitor comprises the electrode film and the pixel electrode.
- [Claim 15] 15. The pixel structure of claim 8, further comprising a color filter layer disposed between the second substrate and the electrode film.
- [Claim 16] 16. A method of driving a pixel having a structure described in claim 8, comprising the step of applying a toggle voltage as a common inversion voltage (V_{com}) to the common electrode, wherein the common electrode is electrically connected to one of the terminals of the liquid crystal capacitor as well as one of the terminals of the storage capacitor.